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Should College Students Assessed as Needing Remedial Algebra Take College-Level Statistics Instead?

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Our newly published results provide the first direct support for what is known as co-requisite remediation, an approach designed to help students succeed in college after they have been assessed as needing remediation. We can use approaches such as this to help students progress in college after they have been assessed as needing remediation in mathematics.

There is general agreement that more students need to graduate from college in the United States. The United States is currently only 14th in the world in the percentage of young adults with a college degree, and the number of jobs requiring a college degree has been increasing more than the supply of degree holders.

Increasing the number of college graduates is not only a matter of more students going to college, but of more students finishing college. United States graduation rates are low: Only 68 percent of students who start a bachelor's degree at a public college or university—intended to take four years—finish it within six. Only 22 percent of students who start an associate's degree at a public institution—intended to take two years—finish it within three. Many students never finish their degrees. The result is huge amounts of wasted time and money for students, colleges and taxpayers alike. Due to having to pay for remedial courses, some students run out of financial aid before receiving their bachelor's degrees. In addition, the increasing student loan default amounts in the United States are associated, in part, with more students enrolling in, but not completing, college.

What is responsible for the low completion rates? There are many reasons, but the largest single academic reason is mathematics remediation. The majority of new freshmen in the United States are assessed as needing remediation (not yet ready for college-level work), by far the most commonly assessed remedial need is mathematics,[1] and most students never complete their remedial courses.[2] Without completing mathematics remediation, students cannot enroll in some of the college-level courses required for their degrees and therefore cannot graduate.

Co-requisite remediation has been proposed as a method for helping students succeed in college after they have been assessed as needing remediation. With this approach, students assessed as needing remediation are instead placed in a college-level course with additional support (e.g., tutoring or workshops). Complete College America, for example, has been a strong advocate for such approaches.

However, although there have been many students shown to pass these sorts of courses, there has been no causal evidence—no evidence showing that these sorts of courses directly increase pass

rates and college success—until now. Our experiment, supported by the Spencer Foundation and by The City University of New York (CUNY), is the first to provide such evidence.

We randomly assigned over 900 students at three CUNY community colleges to one of three course types: traditional remedial, non-credit, elementary algebra; that same course with additional support (weekly two-hour workshops); or college-level, credit-bearing, introductory statistics with additional support (weekly two-hour workshops). Twelve professors, four at each of the three colleges, each taught one section of each of the three course types.

As is typical nationally, a minority of the students (only 39 percent) who took the traditional, remedial, elementary algebra course passed. However, 56 percent of the students passed statistics. In addition, one year after the experiment was over, 57 percent of the statistics students had satisfied all of their colleges' quantitative requirements for a degree, but only 16 percent of the traditional elementary algebra students had done so. The statistics students had also accumulated significantly more college-level credits than the other students, even excluding any statistics credits.

In other words, the students who were randomly assigned to college-level statistics with additional support have done well with their college requirements, despite not evidencing knowledge of elementary algebra on entering college. We do not yet know the effects of our experiment on graduation rates, but it seems likely that significantly more of the students assigned to statistics will receive their college degrees than will the other students.

One aspect of our results is particularly encouraging. Students from underrepresented groups (Blacks and Hispanics) are more likely to be assessed as needing remediation and are less likely to graduate than students from other groups (a performance gap).[1, 3] However, because our results did not differ according to students' race or ethnicity, were our approach to be widely used, the graduation performance gaps would likely decrease.

An unexpected finding of our experiment was that, in comparison to the students randomly assigned to the other two course types, the students who were randomly assigned (in summer 2013) to the traditional, remedial, elementary algebra course with two-hour weekly workshops were significantly less likely to enroll in their assigned course (in fall of 2013). In fact, in comparison to the two other course types, the students assigned to the remedial-course-with-workshops group were significantly less likely to attend college at all that fall—a CUNY college or any other college.

We must therefore consider the possibility that assigning students to a lengthy, noncredit, remedial treatment can discourage them from attending college altogether. Such a possibility is consistent with much research indicating that increasing the delay to a reward, such as the reward of graduation, decreases the motivation to work for that reward. Further, the longer it takes until graduation, the more opportunity exists for external events to interfere with graduation. And with at least 39 percent of United States college students coming from families with quite limited financial resources, 62 percent working at least part-time, and 28 percent having children, it is all too easy for those external events to occur. All of these findings support streamlining and accelerating remedial treatments as much as possible.

Yet not everyone supports giving co-requisite remediation with a statistics course to students assessed as needing remediation in mathematics. In particular, some mathematics faculty believe that every college graduate should demonstrate facility with elementary algebra, whether or not that graduate needs to know such information for his or her major or career. Other mathematics faculty believe that, for many students, statistics will ultimately be more useful than algebra and so do not see a need for students to pass a separate algebra course. With support from the Teagle Foundation, faculty and administrators from three CUNY community colleges are currently working to apply rigorous evidence such as ours to redesign curricula and course requirements so as to increase college students' success.

Institutions of higher education, as well as policy makers, need to decide whether they will or will not require algebra of all students. They need to decide whether demonstrating a knowledge of algebra is important enough to prevent, by itself, many students from attaining a college degree, students who may never directly use algebra after their algebra course ends. Based on our research, at CUNY, each fall alone, by very conservative estimates, thousands more students would satisfy their college-level quantitative requirements were these students permitted to take statistics with extra support rather than being required to take remedial elementary algebra.

Regardless of anyone's views on what knowledge and skills college graduates should and should not be expected to demonstrate, we now know that most students can pass a college-level quantitative course without recently demonstrating knowledge of elementary algebra.

References

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